

CLAIMS

1. A reflective liquid crystal device comprising:  
a first substrate;  
a transparent second substrate opposed to the first substrate;  
5 a liquid crystal held between the first and second substrates;  
a reflecting electrode layer arranged on the first substrate  
opposite to the second substrate;  
a polarizer provided on a side of the second substrate, which is  
opposite to a first substrate side thereof;  
10 a first retardation plate arranged between the polarizer and the  
second substrate; and  
a second retardation plate arranged between the polarizer and the  
first retardation plate;  
wherein a twist angle of the liquid crystal is 230 to 260 degrees;  
15 a minimum and maximum  $\Delta n d$  (product of optical anisotropy  $\Delta n$  and  
thickness  $d$ ) of the liquid crystal are  $0.85 \mu\text{m}$  or less and  $0.70 \mu\text{m}$  or  
more, respectively;  
And of the first retardation plate is  $150 \pm 50 \text{ nm}$  or  $600 \pm 50 \text{ m}$ ;  
And of the second retardation plate is  $550 \pm 50 \text{ nm}$ ;  
20 an angle  $\theta_1$  formed by a transmission axis or absorption axis of the  
polarizer and an optical axis of the second retardation plate is 15 to  
35 degrees; and  
an angle  $\theta_2$  formed by an optical axis of the first retardation  
plate and the optical axis of the second retardation plate is 60 to 80  
25 degrees.

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2. A reflective liquid crystal device comprising:

a first substrate;

a transparent second substrate opposed to the first substrate;

a liquid crystal held between the first and second substrates;

5 a reflecting electrode layer arranged on the first substrate  
opposite to the second substrate;

a polarizer provided on a side of the second substrate, which is  
opposite to a first substrate side thereof;

10 a first retardation plate arranged between the polarizer and the  
second substrate; and

a second retardation plate arranged between the polarizer and the  
first retardation plate;

wherein a twist angle of the liquid crystal is 230 to 260 degrees;

15 a minimum and maximum  $\Delta nd$  (product of optical anisotropy  $\Delta n$  and  
thickness  $d$ ) of the liquid crystal are  $0.85 \mu m$  or less and  $0.70 \mu m$  or  
more, respectively;

And of the first retardation plate is  $150 \pm 50 \text{ nm}$ ;

And of the second retardation plate is  $610 \pm 60 \text{ nm}$ ;

20 an angle  $\theta_1$  formed by a transmission axis or absorption axis of the  
polarizer and an optical axis of the second retardation plate is 10 to  
35 degrees; and

an angle  $\theta_2$  formed by an optical axis of the first retardation  
plate and the optical axis of the second retardation plate is 30 to 60  
degrees.

25 3. The reflective liquid crystal device according to Claim 1,

wherein And of the liquid crystal is 0.70 to 0.85  $\mu\text{m}$ .

~~4. The reflective liquid crystal device according to Claim 2,  
wherein And of the liquid crystal is 0.70 to 0.85  $\mu\text{m}$ .~~

5. The reflective liquid crystal device according to Claim 1,  
5 further comprising a color filter provided on the liquid crystal side of  
the first or second substrate.

6. The reflective liquid crystal device according to Claim 2,  
further comprising a color filter provided on the liquid crystal side of  
the first or second substrate.

10 7. The reflective liquid crystal device according to Claim 1,  
wherein the reflecting electrode layer comprises a single-layer  
reflecting electrode.

8. The reflective liquid crystal device according to Claim 2,  
wherein the reflecting electrode layer comprises a single-layer  
15 reflecting electrode.

9. The reflective liquid crystal device according to Claim 1,  
wherein the reflecting electrode layer has a laminated structure  
comprising a reflecting film, a transparent insulating film arranged on  
the reflecting film, and a transparent electrode arranged on the  
20 insulating film.

10. The reflective liquid crystal device according to Claim 2,  
wherein the reflecting electrode layer has a laminated structure  
comprising a reflecting film, a transparent insulating film arranged on  
the reflecting film, and a transparent electrode arranged on the  
25 insulating film.

11. The reflective liquid crystal device according to Claim 1,  
wherein a passive matrix driving system in a normally black mode is  
used.

12. The reflective liquid crystal device according to Claim 2,  
5 wherein a passive matrix driving system in a normally black mode is  
used.

13. The reflective liquid crystal device according to Claim 1,  
wherein unevenness is formed on a surface of the first substrate  
opposite to the second substrate.

14. The reflective liquid crystal device according to Claim 2,  
10 wherein unevenness is formed on a surface of the first substrate  
opposite to the second substrate.

15. A transflective liquid crystal device comprising:  
a first transparent substrate;  
15 a second transparent substrate opposed to the first substrate;  
a liquid crystal held between the first and second substrates;  
a light source provided on a side of the first substrate, which is  
opposite to the liquid crystal side thereof;

a transflective electrode layer arranged on the first substrate  
20 opposite to the second substrate;

a polarizer provided on a side of the second substrate, which is  
opposite to a first substrate side thereof;

a first retardation plate arranged between the polarizer and the  
second substrate; and

25 a second retardation plate arranged between the polarizer and the

first retardation plate;

wherein a twist angle of the liquid crystal is 230 to 260 degrees;

a minimum and maximum  $\Delta n d$  (product of optical anisotropy  $\Delta n$  and thickness  $d$ ) of the liquid crystal are  $0.85 \mu\text{m}$  or less and  $0.70 \mu\text{m}$  or

5 more, respectively;

And of the first retardation plate is  $150 \pm 50 \text{ nm}$  or  $600 \pm 50 \text{ nm}$ ;

And of the second retardation plate is  $550 \pm 50 \text{ nm}$ ;

an angle  $\theta_1$  formed by a transmission axis or absorption axis of the polarizer and an optical axis of the second retardation plate is 15 to  
10 35 degrees; and

an angle  $\theta_2$  formed by an optical axis of the first retardation plate and the optical axis of the second retardation plate is 60 to 80 degrees.

16. A transfective liquid crystal device comprising:

15 a first transparent substrate;

a second transparent substrate opposed to the first substrate;

a liquid crystal held between the first and second substrates;

a light source provided on a side of the first substrate, which is opposite to the liquid crystal side thereof;

20 a transfective electrode layer arranged on the first substrate opposite to the second substrate;

a polarizer provided on a side of the second substrate, which is opposite to a first substrate side thereof;

a first retardation plate arranged between the polarizer and the  
25 second substrate; and

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a second retardation plate arranged between the polarizer and the first retardation plate;

wherein a twist angle of the liquid crystal is 230 to 260 degrees;

a minimum and maximum  $\Delta n$  (product of optical anisotropy  $\Delta n$  and thickness  $d$ ) of the liquid crystal are  $0.85 \mu\text{m}$  or less and  $0.70 \mu\text{m}$  or more, respectively;

And of the first retardation plate is  $150 \pm 50 \text{ nm}$ ;

And of the second retardation plate is  $610 \pm 60 \text{ nm}$ ;

an angle  $\theta_1$  formed by a transmission axis or absorption axis of the polarizer and an optical axis of the second retardation plate is 10 to 35 degrees; and

an angle  $\theta_2$  formed by an optical axis of the first retardation plate and the optical axis of the second retardation plate is 30 to 60 degrees.

15 17. The transfective liquid crystal device according to Claim 15, wherein  $\Delta n$  of the liquid crystal is  $0.70$  to  $0.85 \mu\text{m}$ .

~~18. The transfective liquid crystal device according to Claim 16, wherein  $\Delta n$  of the liquid crystal is  $0.70$  to  $0.85 \mu\text{m}$ .~~

19. The transfective liquid crystal device according to Claim 15, 20 further comprising a color filter provided on the liquid crystal side of the first or second substrate.

20. The transfective liquid crystal device according to Claim 16, further comprising a color filter provided on the liquid crystal side of the first or second substrate.

25 21. The transfective liquid crystal device according to Claim 15,

wherein the transflective electrode layer comprises a reflecting layer having a slit formed therein.

22. The transflective liquid crystal device according to Claim 16, wherein the transflective electrode layer comprises a reflecting layer having a slit formed therein.

23. The transflective liquid crystal device according to Claim 21, wherein the slit has a width of 3 to 20  $\mu\text{m}$ .

24. The transflective liquid crystal device according to Claim 22, wherein the slit has a width of 3 to 20  $\mu\text{m}$ .

25. The transflective liquid crystal device according to Claim 15, wherein the transflective electrode layer has a laminated structure comprising a transflective film, a transparent insulating film arranged on the transflective film, and a transparent electrode arranged on the insulating film.

26. The transflective liquid crystal device according to Claim 16, wherein the transflective electrode layer has a laminated structure comprising a transflective film, a transparent insulating film arranged on the transflective film, and a transparent electrode arranged on the insulating film.

27. The transflective liquid crystal device according to Claim 15, wherein a passive matrix driving system in a normally black mode is used.

28. The transflective liquid crystal device according to Claim 16, wherein a passive matrix driving system in a normally black mode is used.

29. The transflective liquid crystal device according to Claim 15,  
further comprising:

another polarizer arranged between the first substrate and the  
light source; and

5 another retardation plate arranged between the first substrate and  
the polarizer.

30. The transflective liquid crystal device according to Claim 16,  
further comprising:

another polarizer arranged between the first substrate and the  
10 light source; and

another retardation plate arranged between the first substrate and  
the polarizer.

31. The transflective liquid crystal device according to Claim 15,  
wherein unevenness is formed on a surface of the first substrate  
15 opposite to the second substrate.

32. The transflective liquid crystal device according to Claim 16,  
wherein unevenness is formed on a surface of the first substrate  
opposite to the second substrate.

33. An electronic apparatus comprising a reflective liquid crystal  
20 device according to Claim 1.

34. An electronic apparatus comprising a reflective liquid crystal  
device according to Claim 2.

35. An electronic apparatus comprising a transflective liquid  
crystal device according to Claim 15.

25 36. An electronic apparatus comprising a transflective liquid

crystal device according to Claim 16.

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